## Science Data Production Confidence Test - SDP2

Test Objectives:

This test verifies requirements associated with the science data production functionality of the ECS. The objectives of this test are:

- to verify that the science operations team can plan, schedule, and execute data production runs (a production run which stresses system resources is scheduled and the results examined),
- verify priority processing,
- verify the QA functionality as it relates to the data production environment,
- verify emergency procedures, and
- verify production performance.

Test Configuration:

Hardware and software configurations at each ECS site are managed and tracked by the M&O organization at that site. The most current configuration status report will be obtained prior to the start of testing and be referenced in the test report.

The data flow for test SDP2.3 is depicted in exhibit 2-1.

Exhibit 2-1. Data Flows for QA of Data Products

Participants and Support Requirements:

Participants:

M&O Support at the LaRC DAAC for V1

Communications:

Voice - NA
Data - LAN used for data transfers within ECS.
IP Addresses: TBS

Equipment and Software:

Hardware: Science Data Server, Storage Management Server
Software: Planning Subsystem, Data Processing Subsystem, Product Queuing and Management, QA Client Support, Access Control & Management, Working Storage, Data Repository, and Science processors

Test Tools:

LoadRunner for performance testing.

Test Data:

| Description / Characteristics | Source | File/script name & Location |
|---|---|---|
| CERES Operational Science S/W Pkg. | DAAC | |
| MISR Operational Science S/W Pkg. | DAAC | |
| MOPITT Operational Science S/W Pkg. | DAAC | |

Test Case Descriptions:

**SDP2.1 Production Run**

This test verifies the operability of the science data production. A production run, which stresses system resources, is scheduled using AutoSys. Stressing system resources implies that the most complicated and largest sized product will be chosen to be generated. Data dependencies are exercised. The test is successful if products are produced and the run waits for data availability before it is executed. Reports are generated and verified.

Requirements to be Verified:

EOSD0720 ESN-0070 SMC-3350 SMC-3385

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| 1.001 | DAAC | Ensure that the data necessary for the data production has been ingested and is currently archived (from V1-SDP-01.3). | The data has been ingested and is currently in the archive. | | |
| 2.001 | DAAC | Create a job to be | The job is added | | |

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| | Production Planner | executed today and add it to the current plan. | to the month long current active plan and scheduled to be executed on the day of the test. | | |
| 2.002 | DAAC Production Planner | Invoke the Planning workbench. | The planning workbench software is invoked. | | |
| 2.003 | DAAC Production Planner | Download the daily schedule of jobs to the AutoSys scheduling tool. | The production schedule is downloaded to the AutoSys tool. | | |
| 2.004 | DAAC Production Planner | Using the AutoSys JIL interface, convert Data Processing Request (DPRs) into AutoSys commands. | The jobs required for a PGE are displayed and AutoSys places the jobs in a 'hold' state awaiting their dependencies. | | |
| 2.005 | DAAC Production Planner | Monitor production processing. | As the necessary data is retrieved from the archive and the job dependencies are met, the status of the jobs on 'hold' will change to 'active' and eventually 'completed'. | | ESN-0070#A, |
| 3.001 | DAAC Ingest / Distribution Technician | Generate the Resource Utilization Report covering the time period of this test. | Verify that system's performance falls within the ESDIS project established performance criteria. | | EOSD0720#A, SMC-3350#A, SMC-3385#A, |

**SDP2.2 Priority Processing**

This test verifies that the system can respond to a request for priority processing. The system's production queue is loaded. A priority request enters the system and the scheduling must be adjusted to perform the priority request. The systems response is evaluated.

Requirements to be Verified:

SMC-1345 SMC-3350

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| 1.001 | DAAC Resource Planner | The LaRC DAAC should have an existing schedule of jobs to execute already in the system at the time of this test. | Verify that the job queue is loaded with no resource or scheduling conflicts. | | |
| 2.001 | DAAC Resource Planner | Log onto the DAAC Resource Planner GUI and verify that the job queue is loaded and that no conflicts exist. | The display verifies that the job queue is loaded and no conflicts exist. | | |
| 2.002 | DAAC Resource Planner | Create a Resource Plan using the Resource Planning Tool GUI. The created plan should result in a resource conflict. The new plan should also have a higher priority than the plan(s) it is conflicting with. | The planning tool is displayed and the operator creates a plan which includes a resource conflict. | | |
| 2.003 | DAAC Production | Receives notification of the | The display shows the newly | | |

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| | Planner | conflict and displays the resource plans which are in conflict. | created plan and the plan(s) which are in conflict with it. | | |
| 2.004 | DAAC Production Planner | Review the schedules and adjust the conflicting schedules so that all plans can be executed. | A new schedule is generated. | | SMC-1345#A, |
| 2.005 | DAAC Production Planner | Send an email to the DAAC Resource Planner containing the new conflict free schedule. | The DAAC Resource Planner receives the email and notifies the job requesters of the new schedule. | | |
| 2.006 | DAAC Resource Planner | Once all job owners agree to the new schedule, the Resource Planner adjust the schedule as suggested, allowing the higher priority job to execute first. | The job schedule is modified and all jobs execute successfully. | | |
| 3.001 | DAAC | Print event history log. | The log should contain the detected conflict, the resolution of the conflict, and the successful execution of all jobs. | | |
| 3.002 | DAAC | Generate performance reports for the | The report should include information about | | SMC-3350#A, |

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| | | period covered by this test. | the conflict, when it was detected, when it was resolved, and the outcome of all jobs involved with the conflict. | | |

**SDP2.3 Quality Assurance**

This test verifies the QA process involved with the production functionality. Produced products are QA'd both locally at the DAAC and at the remote SCFs as necessary. Metadata updates are verified. The data flow specification for this test is defined in Exhibit 2-1 and were obtained from [32] figure 6-1 of the ICD between ECS and the SCF.

Requirements to be Verified:

IMS-0350 SMC-3340 SMC-3345

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| 1.001 | LaRC DAAC | Generate a list of CERES standard products which can have QA performed on them. | List of products generated. | | |
| 2.001 | CERES SCF | Submit a QA notification Specification to the LaRC DAAC. | The notification is received at the DAAC and recorded in the Ingest History Log. | | SCF-0200#A, |
| 2.002 | LaRC DAAC | Trigger a QA Quality Request Notification to be sent to the | The SCF receives the QA Quality Request Notification. | | SCF-0210#A, |

| | | | | | |
|---|---|---|---|---|---|
| | | CERES SCF for a given CERES standard product file. | | | |
| 2.003 | CERES SCF | Send a Request for Data to QA to the LaRC DAAC. | The DAAC receives the request and records it in the Ingest History Log. | | SCF-0220#A, |
| 2.004 | LaRC DAAC | Send the requested data to the CERES SCF as data delivered for QA. | The SCF receives the data . | | SCF-0230#A, |
| 2.005 | CERES SCF | Perform QA on the data product. | QA is performed and an On Time QA report is generated. | | |
| 2.006 | CERES SCF | Send the On Time QA report to the LaRC DAAC and updated product related metadata. | The DAAC receives the report and the updated metadata and records it in the Ingest History Log. | | IMS-0350#A, SMC-3340#A, SMC-3345#A, SCF-0240#A, SCF-0250#A, |
| 2.007 | LaRC DAAC | Update the metadata associated with the data product. | Metadata is successfully updated. | | |
| 3.001 | LaRC DAAC | Verify that the QA report and updated metadata are in the archive. | Both the QA report and the updated metadata appear in the archive. | | |

**SDP2.4 Emergency Procedures**

This test verifies the fault tolerance of the production environment. Errors are inserted into the system and the system's responses are evaluated. Required resources will be taken away and necessary data will be marked unavailable.

Requirements to be Verified:

DADS2000 EOSD0720 SMC-1345 SMC-3350 SMC-3385

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| 1.001 | DAAC | Ensure that the data necessary to execute the PGEs has been ingested and archived. | The data has been ingested and is currently in the archive. | | |
| 1.002 | DAAC | Review the data requirements for one of the PGEs and identify one of the data items which can be marked as unavailable later in the test. | Record data item name _____ _____ | | |
| 2.001 | DAAC | Create a job to be executed today and add it to the plan. The job is to execute the PGE analyzed in step 1.002. | The job is added tot the month long current active plan and scheduled to be executed on the day of the test. | | |
| 2.002 | DAAC | Once the job starts to execute, mark the data item recorded in step 1.002 as unavailable. | When the PGE requests the data item, a message is returned which states that the data item is unavailable and the job is placed in a wait state until the data becomes available. | | DADS2000#A, |
| 2.003 | DAAC | Make the data item available again. | The job resumes execution. | | SMC-1345#A, |

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| 2.004 | DAAC | While the job is executing, unplug the archive device so that the data can not be retrieved. | When the job attempts to retrieve the data, an error message is displayed stating that the data cannot be retrieved and the job returns to the suspended state awaiting data availability. | | |
| 2.005 | DAAC SMC | Observe the display monitoring the archive devices. | The system monitor detects the off lined archive device. Alarm is generated including recommendation s for fixing the problem | | DADS2000#A, |
| 2.006 | DAAC | Place the archive device on-line. | The job resumes. | | SMC-1345#A, |
| 2.007 | DAAC SMC | Observe the display monitoring the archive devices. | The system monitor reflects the archive device is back online. | | |
| 2.009 | DAAC | Monitor the production processing. | The job completes successfully. | | |
| 3.001 | DAAC | Generate the Resource Utilization Report covering the time period of the test. | Verify the system's performance falls within the ESDIS project established performance criteria. | | EOSD0720#A, SMC-3350#A, SMC-3385#A, |

**SDP2.5 Production Performance**

This test analyzes the product generation performance. The test will stress the production environment, loading the maximum number of jobs and performing queue operations (suspending, resuming, canceling, etc.). Actual results are compared to the scheduled plans. Resource utilization is also analyzed.

Requirements to be Verified:

EOSD0720 SMC-3335 SMC-3350 SMC-3385

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| 1.001 | DAAC | Coordinate the scheduling of PGE and data requirements. | A list of PGEs which will execute is obtained. | | |
| 2.001 | DAAC | Load the job queue with the maximum number of jobs which the system will use (number is TBD). | All jobs are loaded in the system. | | |
| 2.002 | DAAC | Monitor job performance. | The jobs go from waiting to active to completed. | | |
| 2.003 | DAAC | Using the AutoSys tool, change job status some of the jobs. As they are executing, pause them. As they begin execution kill them. Suspend some of the jobs. Cancel some of the jobs. Resume some of the suspended jobs. | The job change status as the operator changes them. | | |
| 2.004 | DAAC | Monitor job performance. | All restarted or resumed jobs | | |

| STEP | TEST STATION | OPERATOR ACTION | EXPECTED RESULT | COMMENTS | ALLOCATED REQMNTS |
|---|---|---|---|---|---|
| | | | complete successfully. | | |
| 3.001 | DAAC | Generate the Resource Utilization Report covering the time period for this test. | Verify that system's performance falls within the ESDIS project established performance criteria. | | EOSD0720#A, SMC-3335#A, SMC-3350#A, SMC-3385#A, |